

Attorney's Docket: 2000US201
Serial No.: 09/771,803
Art Unit: 1732

Claim Rejections Under 35 USC § 103

Claims 1-9 stand rejected under 35 USC § 103(a) as being unpatentable over Clark et al. (US Patent 6,046,265). This rejection is respectfully traversed, as it is Applicants' respectful position that the Office has not established a *prima facie* case of obviousness of the present claims in view of the prior art.

The Office is of the position that Clark discloses "providing a first color concentrate comprising a first colorant concentrate in a matrix of crystalline/amorphous resins (PBT/PCT or PEN/PCT: Examples 5 and 7, Column 11)." Applicants courteously disagree with the Office's position.

Clark discloses a "crystalline resin molded article having a non uniform appearance comprising a molded blend of a granular crystalline resin base and a granular crystalline resin colored concentrate." Column 1, lines 40-45. It is clear from the disclosure of Clark that the color concentrate is to include a crystalline resin color concentrate. See *inter alia*, column 2 lines 65-67; column 3, lines 45-51; column 4 lines 24-28 and lines 40-43; column 4 lines 46-50; and claim 1.

The Office makes reference to Examples 6 and 7 of Clark in support of its position that the color concentrate includes both a crystalline and amorphous resin. The Office's reliance upon Example 6 and 7 is misplaced. PBT (poly(1,4-butylene terephthalate), PCT (poly cyclohexyl terephthalate) and PEN (polyethylene naphthanoate) are all crystalline resins. Attached hereto, for the convenience of the Examiner are the data sheets for PBT, PCT and PEN all of which show the discrete melting points of the respective resins. THERMX® Copolyester 6761 is PEN.

Applicants' contention that Examples 6 and 7 of Clark show a mixture of crystalline resins is further buttressed by the disclosure of Clark in column 11, beginning on line 41, where it is stated:

Attorney's Docket: 2000US201
Serial No.: 09/771,803
Art Unit: 1732

In cases where an equal mixture of crystalline resins are used in the carrier (or matrix), the melting temperature of the higher melting component is chosen to determine the difference in carrier and matrix T_m. Thus in Example 6, a 1:1 mixture of PBT:PCT, the carrier resin T_m is 285 degrees centigrade. The matrix resin of Example 6 is dominant in PBT (T_m=225 degrees centigrade). The difference in carrier and matrix resin T_m in Example 6 is 285 - 225 = 60 degrees Centigrade. In Example 7, the carrier resin is a 1:1 mixture of PEN:PCT. In this case the PCT T_m dominates the carrier resin mixture. The matrix T_m is dominated by PBT so the difference in T_m is again 60 degrees Centigrade. (emphasis added)

Thus, it is abundantly clear from the text of the Clark that its crystalline resin color concentrate does not, nor is it intended to, include an amorphous resin.

This is in stark contrast to Applicants' claimed invention, wherein it is stated in claim 1, element a), that the color concentrate comprises a colorant carried in a mixture of crystalline organic polymer and an amorphous organic polymer. The fact that Applicants provide a color concentrate having both a crystalline organic polymer and amorphous organic polymer has significant chemical ramifications which alone patentably distinguish the present invention from the Clark reference. As the amorphous resin of the color concentrate melts while the crystalline resin does not, the crystalline resin of the color concentrate provides a vehicle for the dispersion of the colorant throughout the base resin in discrete domains, yielding a unique marbled effect, which is not possible employing the teachings of Clark.

As delineated in MPEP § 2143.03, the prior art must teach or suggest all of the limitations of a claim. As Clark does not teach, disclose or suggest a color concentrate having both a crystalline and amorphous resin, the Office has not met its burden of establishing a *prima facie* case of obviousness.

With respect to element d) of claim 1 the Office states:

Regarding step "d)", it would have been obvious to one of ordinary skill in the art at the time the invention was made to maintain the temperature of the mixture of step "c)" below the

Attorney's Docket: 2000US201
Serial No.: 09/771,803
Art Unit: 1732

melting or flow temperature of the crystalline polymer of step "a)" by considering the disclosed temperature difference required to form the desired swirl effect (column 4, lines 1-8; column 4, lines 24-28).

Respectfully stated, the Office's position is antithetical to Clark's disclosure. In column 3, lines 22-27 Clark explicitly states:

The increasing temperature gradient and degree of mixing along the barrel is controlled so that [the] color concentrate melts just prior to the formation of the final article so that the concentrate is non-uniformly dispersed . . . (emphasis added)

It is clear from the disclosure of Clark that its color concentrate is intended to melt. In consequence, not only can Clark not provide the requisite motivation mandated by §103, but actually, Clark teaches away from Applicants' process as Applicants claim that the temperature be maintained below the melt or flow temperature of the crystalline resin of the color concentrate. This additional patentably distinguishable characteristic of Applicants' invention, namely that the crystalline resin of the color concentrate is maintained below its melt or flow temperature is nowhere taught or suggested in Clark.

It is beyond contention that §103 requires the Office to substantiate that each and every element of an applicant's claim is taught or suggested by the prior art. It is clear from the teachings of Clark that the Office can not carry this burden, as Clark teaches melting the crystalline resin of the color concentrate while Applicants expressly do not.

Element d) of Applicants' process recited in claim 1 reads as follows:

providing sufficient heat to maintain the temperature of the mixture of step c) above the glass transition temperatures of the polymers of steps a) and b) and above the temperatures at which the amorphous polymers of step a) melt or flow, but below the melting or flow temperature of the crystalline polymer of step a).

Attorney's Docket: 2000US201
Serial No.: 09/771,803
Art Unit: 1732

As detailed above, Clark provides no teaching for providing a first color concentrate having a mixture of crystalline organic polymer and an amorphous organic polymer. Therefore, Clark can also not provide any motivation to employ that which is recited in step d) namely, to maintain the temperature above the glass transition temperature of the amorphous polymer but below the melting or flow temperature of the crystalline polymer of the color concentrate.

The Office references column 4, lines 1-8 and lines 24-28 as evidence of its position that it would be obvious to one with ordinary skill in the art to employ that which is recited in step d) of Applicants' claim 1. An examination of Clark, however, reveals only that Clark teaches that the melting temperature of its color concentrate is selected to be at least about 15 degrees Centigrade higher than the melting temperature range of the base resin so that the base resin melts before the color concentrate melts. This disclosure does not make obvious that which is recited in step d) of Applicants' claim, namely, that the amorphous polymer of Applicants' color concentrate is allowed to melt, but the crystalline polymer of Applicants' color concentrate is kept at a temperature below its melting or flow temperature.

In support of its position, the Office states:

It would have been obvious to one of ordinary skill in the art at the time the invention was made to keep the mixture above the temperature at which the amorphous polymers of step "a)" melt or flow in order to prevent the colors carried by amorphous polymers from mixing with the flowable polymer in excess of the desired amount.

As stated in detail above, Clark does not in anyway teach, disclose or suggest that the color concentrate include both a crystalline organic polymer and an amorphous organic polymer. In consequence, logic alone dictates that Clark can not teach, disclose or suggest that the process run at a temperature above the melting temperature of the amorphous polymer.

Attorney's Docket: 2000US201
Serial No.: 09/771,803
Art Unit: 1732

In view of the above remarks, it is respectfully submitted that Clark provides no motivation for one with ordinary skill in the art to arrive at Applicants' claimed invention. In contrast, a reading of Clark makes it clear that Clark teaches away from employing a color concentrate which includes both a crystalline organic polymer and an amorphous organic polymer. The Clark references is replete with instances suggesting that its alleged contribution to the art is a thermoplastic crystalline resin (see *inter alia* column 1, lines 36-38) having a granular crystalline resin colored concentrate (see column 1 lines 44 and 45; column 2 lines 65-67, column 3 lines 47-53, column 4 lines 23-27, lines 47-49, column 11 lines 41-52 and claim 1.) Clark teaches away from Applicants' invention, since, as Applicants' invention includes a color concentrate having an amorphous polymer, the resultant product is also amorphous to a degree. Moreover, Applicants' process involves maintaining the temperature below the melt or flow temperature of the crystalline portion of the color concentrate.

In consequence, an artisan with ordinary skill in the art, contemplating the modifications to Clark as espoused by the Office, would have an express disincentive to do so. In order to arrive at Applicants' invention as claimed, the artisan would necessarily have to abandon the teachings of Clark which require the color concentrate to have only a crystalline resin mixed with a colorant. It would also be necessary for such artisan to abandon Clark's teaching that the temperature must be sufficient to melt the crystalline resin of the color concentrate. It is therefore Applicants' courteous position that any motivation necessary for one with ordinary skill in the art to arrive at Applicants' claimed invention is the product of impermissible hindsight gained from a knowledge of Applicants' disclosure.

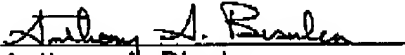
For all the foregoing reasons, it is respectfully submitted that Applicants' invention, as defined by independent claim 1, and all claims depending therefrom, are not made obvious by Clark et al., and therefore, kindly request reconsideration and withdrawal of the rejection.

Attorney's Docket: 2000US201
Serial No.: 09/771,803
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The Office has rejected each of dependent claims 2-10 under 35 USC § 103(a) as being unpatentable over Clark, or Clark in view of Gray et al. (US 5,984,556). With regard to these § 103(a) rejections of dependent claims 2-10, for all the forgoing reasons discussed with respect to the rejection of independent claim 1, it is respectfully contended that claims 2-10 are not made obvious by Clark alone, or in combination with Gray et al. and therefore, Applicants courteously solicit withdrawal of the rejections.

In view of the forgoing amendments and remarks, the present application is believed to be in condition for allowance, and reconsideration of it is requested. If the Examiner disagrees, she is requested to contact the attorney for Applicants at the telephone number provided below.

Respectfully submitted,


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CELANEX® 1600A

Celanex 1600A is a high molecular weight grade of unreinforced polybutylene terephthalate used in both extrusion and injection molding applications.

products
data sheets
MSDS

Property**Method****Value****Units****Physical Properties**

ISO 1183

1310

kg/m³

markets/applications

design/technology

cd releases

Mechanical Properties

Tensile modulus (1mm/min)

ISO 527-2/1A

2550

MPa

Tensile stress at yield (50mm/min)

ISO 527-2/1A

60

MPa

Tensile strain at yield (50mm/min)

ISO 527-2/1A

5

%

Nominal strain at break (50mm/min)

ISO 527-2/1A

>50

%

Tensile stress at 50% strain (50mm/min)

ISO 527-2/1A

28

MPa

Flexural modulus (23°C)

ISO 178

2200

MPa

Flexural strength (23°C)

ISO 178

80

MPa

Charpy impact strength @ 23°C

ISO 179/1eU

NB

KJ/m²

Charpy impact strength @-30°C

ISO 179/1eU

210

KJ/m²

Charpy notched impact strength @ 23°C

ISO 179/1eA

7

KJ/m²

Charpy notched impact strength @-30°C

ISO 179/1eA

6.5

KJ/m²

Notched impact strength (Izod) @ 23°C

ISO 180/1A

5.5

KJ/m²

Rockwell hardness

ISO 2039-2

72

M-Scale

Thermal Properties

Melting temperature (10 C/min)

ISO 11357-1,-2,-3

225

°C

DTUL @ 1.8 MPa

ISO 75-1, -2

50

°C

DTUL @ 0.45 MPa

ISO 75-1, -2

150

°C

Coeff. of linear therm expansion (parallel)

ISO 11359-2

1.1

E-4/°C

Flammability at thickness h

UL94

HB

Class

thickness tested (h)

UL94

0.75

mm

Electrical Properties

Relative permittivity - 100Hz

IEC 60250

4.0

Relative permittivity - 1MHz

IEC 60250

3.5

Dissipation factor - 100Hz

IEC 60250

14

E-4

Dissipation factor - 1MHz

IEC 60250

210

E-4

Volume resistivity

IEC 60093

>1E13

ohm-m

Surface resistivity

IEC 60093

>1E15

ohm

Electric strength

IEC 60243-1

23

KV/mm

Comparative tracking index CTI

IEC 60112

600

-

Processing Conditions:**Parameter****Range****Units**

Rear temperature

450-470(230-240)

°F (°C)

Center temperature

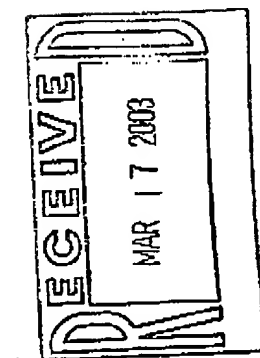
460-480(235-250)

°F (°C)

Front temperature

470-500(240-260)

°F (°C)



Data Sheet

Front temperature	470-500(240-260)	°F (°C)
Nozzle temperature	480-500(250-280)	°F (°C)
Melt temperature	460-500(235-260)	°F (°C)
Mold temperature	150-200(65-93)	°F (°C)
Back pressure	0-50	psi

Drying Conditions:

4 Hrs. at 250F, <0.02% moisture

Regrind:

Up to 25%, Clean and Dry

Additional Grade Information: [expand all](#)**Grade Literature List:**View all available literature for the selected grade. [expand to view](#)**Product Literature List:**View all available literature for the product. [expand to view](#)**Material Safety Data Sheets:**View all available MSDSs for the selected grade. [expand to view](#)**Underwriter's Laboratory (UL) Yellow Cards:**View all available UL yellow cards for the selected grade. [expand to view](#)**NSF International Standards:**View all available NSF standards information for the selected grade. [expand to view](#)**Disclaimer:**

NOTICE TO USERS: Values shown are based on testing of laboratory test specimens and represent data that fall within the standard range of properties for natural material. Colorants or other additives may cause significant variations in data values. These values are not intended for use in establishing maximum, minimum, or ranges of values for specification purposes. Any determination of the suitability of this material for any use contemplated by the users and the manner of such use is the sole responsibility of the users, who must assure themselves that the material as subsequently processed meets the needs of their particular product or use.

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HiPERTUF 90000

HiPERTUF is a M&G Group trademark.

GRUPPO MOSSI & GHISOLFI

July 2000

Polyethylene Naphthalate (PEN)

Data Sheet

DESCRIPTION

HiPERTUF 90000 Polyester Resin is a 2,6 Dimethyl Naphthalate-based polyethylene naphthalate (PEN) homopolymer resin. It is an intermediate molecular weight polymer with an approximate 900 Pascal Second melt viscosity (MV) at 20 reciprocal seconds at 295°C. **HiPERTUF 90000** Polyester Resin is designed with a special catalyst and stabilizer system that offers property retention during conversion. This superior stability also enables application of the required drying conditions without affecting color or molecular weight.

HiPERTUF 90000 Polyester Resin exhibits up to five times the oxygen and carbon dioxide barrier protection over PET resins and provides UV barrier up to 383 nm. **HiPERTUF 90000** Polyester Resin is best used for blow molded containers where clarity and sparkle are important along with the higher barrier or the ability to withstand high hot-fill temperatures or sterilization processes. The resin's thermal properties allow it to be sterilized via many of the existing techniques. Application areas include pharmaceutical, cosmetic and baby food packaging.

The following table provides the Parameters that characterize the grade. Some Parameters are shown with values that are specified to fall within certain limits. Other Parameters are shown as a single value that we regard as typical of the grade. Minor differences around this typical value will not detract from the performance of the product. All Parameters are measured, under laboratory conditions, by internal standard analytical methods. Different methods or conditions of analysis may give rise to different values. Purchased material may be accompanied by a Certificate of Analysis or other document, confirming that the product is within specified limits and is consistent with the other values for the stated Parameters.

Property	Unit	Value	Limits	Test Method
Intrinsic viscosity (IV)	dl/gr	0.64	± 0.02	T 3285 / T 103
Acetaldehyde content	ppm	2.5	Max	R 1501
Color (L*-value)	--	80	Min	SMS 2789
Color (b*-value)	--	3	Max	SMS 2789
Melting point ++	°C	267	—	SMS 2844
Mass per 100 chips	g	2.2	± 0.4	SMS 2790
Moisture as packaged	%	None visible	--	--

++ monitored on feed resin only

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GRUPPO MOSSI & GHISOLFI

REGULATORY STATUS

HIPERTUF 90000 Polyester Resin is suitable for the manufacture of articles for numerous food packaging applications. Since food packaging regulations differ from country to country, for information about the regulatory status within the United States under FDA regulations or within Europe under EC and/or national regulations, please contact your local account manager or our Product Stewardship and Regulatory Compliance Department in the US at +1 330 798 6430.

IMPORTANT ASPECTS OF USE IN PROCESSING**Drying**

As with any polyester resin, HIPERTUF 90000 Polyester Resin needs to be dried to a moisture level of 0.005% prior to melt processing to yield the optimum physical properties for the final product. Drying is best accomplished in a continuous high heat dehumidifying type air hopper dryer with a regenerative desiccant bed using -20°F max (-29°C max) dew point air. A minimum air flow rate of 1.0 ft³ per minute per pound of polymer consumed per hour is needed. At 325°F (163°C), a 5 to 6 hour residence time is needed.

Injection molding and Stretch blow molding

Injection molding temperatures should be maintained at the minimum levels needed to produce clear quality preforms. In addition to temperature limits, care should be taken to avoid excessive shear during injection. Typical processing temperatures are generally between 575°F and 600°F (302°C and 316°C). To maximize the benefits of heat stability, barrier and lightweighting, new preform molds designed to match the stretch ratio of the polymer must be used. Use of conventional PET preform molds will not result in the desired property improvements. Contact your local technical representative for recommended stretch ratios. When stretch blow molding, preforms should be heated to minimum levels needed to produce clear, quality biaxially oriented containers. Typical preform surface temperatures are generally 265°F to 285°F (130°C to 141°C).

SAFETY ASPECTS

Please read the Material Safety Data Sheet written for this product. It may be obtained from your HIPERTUF account manager.

- **Handling**

HIPERTUF 90000 Polyester Resin presents no toxic hazards, either from skin contact or inhalation, under normal conditions. Contact with melted polymer should be avoided. Product delivered in bags must not be stacked.

- **Fire precautions**

In common with most other organic polymers, PEN polymers will burn. They are difficult to ignite, but are defined as 'combustible' but not 'highly inflammable'. Reasonable precautions should be taken to ensure absence of sources of ignition in warehouses and storage areas. If large quantities are stored, normal good housekeeping should be enforced, including freedom from dust, uncluttered access ways, sprinkler system etc.

WARRANTY

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EASTMAN

THERMX Copolyester 6761 Natural Product Data Sheet

Property ^a	Test ^b Method	Typical Value, Units ^c
Pellet Properties		
Inherent Viscosity	EMN-A-AC-G- V-1	0.96
Density ^d	D 1505	1.195 g/cm ³
Bulk Density ^e	D 1895	739 kg/m ³ (46 lb/ft ³)
Melt Density @ 300°C (572°F)	D 1238 (Note A- Table 2)	1.09 g/cm ³
Glass Transition Temperature (T _g)	DSC	92°C (198°F)
Crystalline Peak Melting Point (T _m)	D 3418	285°C (545°F)
Heat of Fusion	E 793	67 kJ/kg (16 cal/g)
Thermal Conductivity	C 177	0.21 W/m·K (1.5 Btu·in./h·ft ² ·°F)
Specific Heat		
@ 50°C (122°F)	DSC	1.5 kJ/kg·K (0.36 Btu/lb·°F)
@ 130°C (266°F)	DSC	1.8 kJ/kg·K (0.43 Btu/lb·°F)
@ 180°C (356°F)	DSC	2.0 kJ/kg·K (0.48 Btu/lb·°F)
@ 250°C (482°F)	DSC	2.2 kJ/kg·K (0.53 Btu/lb·°F)
Typical Processing Conditions		
Drying Temperature		121°C (250°F)
Drying Time ^f		4 hrs
Extrusion Temperature		299-302°C (570-576°F)
Injection Molding Temperature		299-316°C (570-600°F)

^aUnless noted otherwise, all tests are run at 23°C (73°F) and 50% relative humidity.

^bUnless noted otherwise, the test method is ASTM.

^cUnits are in SI or US customary units.

^dAmorphous

^ePoured

^fAt Dew Point -29°C to -40°C (-20°F to -40°F)

Comments

Properties reported here are typical of average lots. Eastman makes no representation that the material in any particular shipment will conform exactly to the values given.

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